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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,745	09/11/2006	Gundolf Kiefer	DE 040074	9797
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EXAMINER TABATABAI, ABOLFAZL				
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2624				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/598,745

Applicant(s)

KIEFER ET AL.

Examiner

ABOLFAZL TABATABAI

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2006.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-14 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 11 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/GS-08)
Paper No(s)/Mail Date 03/02/2007

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs, which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (Claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between

the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

2. **Claim 14** is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows.

3. **Claim 14 recites** "a computer program product for performing an interactive visualization,....." embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). That is, the scope of the presently claimed "a software" (line 1 of claim 14) can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The Examiner suggests amending the claim such as **"A computer-readable medium storing a computer program for performing....."** or equivalent in order to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1-9 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent¹ and recent Federal Circuit decisions² indicated that a statutory “process” under 35 U.S.C. 101 must (1) be tied to a machine or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claims recites a series of steps or acts to be performed, the claims neither transform underlying subject matter nor positively tie to a machine that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. The recited steps “varying a rendering method in an image during the interactive input”; “the variation of the rendering method causes a non-uniform quality of the image” and “the image is determined on the basis of the three-dimensional data set” neither transform underlying subject matter nor positively tie to a machine that accomplished the claimed method step. In order for process to be “tied” to a machine, the structure of a machine should be positively recited in a step or steps significant to the basic inventive concept, and NOT just in association with statements of intended use or purpose, insignificant pre or post solution activity, or implicitly. Appropriate correction is required.

¹ *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U. S. 584,588, n.9 (1978); *Gottschalk v. Benson*, 409 U. S. 63, 70 (1972); *Cochrane v. Deener*, 94 U. S. 780, 787-88 (1876).

² *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 2, 4 and 10-14 are rejected under 35 U.S.C. 102 (b) as being anticipated by Laidlaw et al (U. S. 7,355,597).

Regarding claim 1, Laidlaw discloses a method of interactively visualizing a three-dimensional data set of an object of interest, wherein the method allows for an interactive input, the method comprising the step of:

varying a rendering method (column 17, lines 12-15) in an image during the interactive input (column 5, lines 7-22);

wherein the variation of the rendering method causes a non-uniform quality of the image (column 15, lines 40-46); and wherein the image is determined on the basis of the three-dimensional data set (column 5, lines 40-46).

Regarding claim 2, Laidlaw discloses the method according to claim 1, wherein, if there is an interactive input, the image is rendered with the varying rendering method in a pre-scan mode (column 16, lines 64-67); and wherein, if there is no interactive input, the image is re-rendered with a constant rendering method in a full-scan mode, resulting in a maximum quality of the whole image (column 15, lines 40-46).

Claim 4 is similarly analyzed as claim 1 above.

Regarding claim 10, Laidlaw discloses a data processing device, comprising:

a memory for storing a three-dimensional data set of an object of interest
(column 13, lines 5-18);

a data processor for performing an interactive visualization of the three-dimensional data set, wherein the interactive visualization allows for an interactive input, wherein the data processor is adapted for performing the following operation (column 9, lines 6-22): loading the three-dimensional data set (column 12, lines 54-60);

varying a rendering method (column 17, lines 12-15) in an image during the interactive input (column 5, lines 7-22);

wherein the variation of the rendering method causes a non-uniform resolution of the image (column 15, lines 40-46); and wherein the image is determined on the basis of the three-dimensional data set (column 5, lines 40-46).

Claim 11 is similarly analyzed as claims 2 and 4 above.

Claims 12 and 14 are similarly analyzed as claim 1 above.

Regarding claim 13, Laidlaw discloses a scanner system according to claim 12, wherein the scanner system is one of a CT scanner system and a MR scanner system (column 16, lines 64-67).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a

person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 3 and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laidlaw et al (U. S. 7,355,597) in view of Pfister et al (U. S. 7,298,372 B2).

Regarding claim 3, Laidlaw is silent about the specific details regarding the method according to claim 2, wherein the variation of the rendering method comprises a variation of a sampling rate in the image during the interactive input; and wherein the variation of the sampling rate causes a non-uniform resolution of the image.

In the same field of endeavor however, Pfister discloses sample rate adaptive filtering for volume rendering comprises a variation of a sampling rate in the image during the interactive input (column 5, lines 33-40); and wherein the variation of the sampling rate causes a non-uniform resolution of the image (column 6, lines 26-29).

Regarding claim 5, Laidlaw is silent about the specific details regarding the method according to claim 3, wherein the sampling rate comprises a first sampling rate and a second sampling rate; wherein a focus area defines a first area in the image; wherein the first area is sampled with the first sampling rate; and wherein a second area in the image is sampled with the second sampling rate.

In the same field of endeavor however, Pfister discloses sample rate adaptive filtering for volume rendering comprises a first sampling rate and a second sampling rate; wherein a focus area defines a first area in the image (column 5, lines 33-45); wherein the first area is sampled with the first sampling rate (column 5, lines 33-40); and wherein a second area in the image is sampled with the second sampling rate (column 5, lines 41-45).

Regarding claim 6, Laidlaw is silent about the specific details regarding the method according to claim 5, wherein a relative position of the focus area is movable with respect to the image by one of a user and an automatism based on information acquired during rendering.

In the same field of endeavor however, Pfister discloses sample rate adaptive filtering for volume rendering comprises a relative position of the focus area is movable with respect to the image by one of a user and an automatism based on information acquired during rendering (column 7, lines 44-47).

Regarding claim 7 Laidlaw is silent about the specific details regarding the method according to claim 4, wherein the information comprises information selected from the group consisting of an estimation of a complexity of the data set, an availability of hardware resources, and an update speed required from a user.

In the same field of endeavor however, Pfister discloses sample rate adaptive filtering for volume rendering comprises information selected from the group consisting of an estimation of a complexity of the data set, an availability of hardware resources, and an update speed required from a user (column 6, lines 15-29).

Regarding claim 8 Laidlaw is silent about the specific details regarding the method according to claim 1, wherein the rendering includes a ray casting.

In the same field of endeavor however, Pfister discloses sample rate adaptive filtering for volume rendering comprises the rendering includes a ray casting (column 7, lines 42-48).

Regarding claim 9, Laidlaw is silent about the specific details regarding the method according to claim 8, wherein the variation of the sampling rate is performed along a ray applied in the ray casting.

In the same field of endeavor however, Pfister discloses sample rate adaptive filtering for volume rendering comprises the variation of the sampling rate is performed along a ray applied in the ray casting (column 6, lines 1-9).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the variation of the sampling rate as taught by Pfister in the system of Laidlaw because Pfister provides Laidlaw a new and an improved system which the adaptive filtering reduces the number of operations required in elliptical weighted average splatting, and can be implemented efficiently on conventional graphics processing units.

Contact Information

10. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to ABOLFAZL TABATABAI whose telephone number is (571) 272-7458.

The Examiner can normally be reached on Monday through Friday from 9:30 a.m. to 7:30 p.m. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Samir Ahmed, can be reached at (571) 272-7413. The fax phone number for organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Abolfazl Tabatabai/

Primary Examiner, Art Unit 2624

November 24, 2009